should then be darkened, and the utmost possible quietude should be maintained. It is often extremely advantageous, especially in cases of melancholia, to give a glass of egg-nogg or a generous dose of malt extract at bedtime, or a cup of hot chocolate, and in the milder cases or in the convalescent stage a light supper may be combined with these.

Tonics and alteratives may be administered in these curable forms of insanity, according to the rules obtaining in general medicine. Quinine, cod-liver oil, and the malt extracts are most useful. Phosphorus is occasionally a most excellent tonic in the later periods of convalescence, and should be given in the formula first proposed by Ashburton Thompson.[1] Galvanization of the cerebrum and the spinal cord is an invaluable aid in the treatment, especially in the cervical and occipital neuralgias that are so apt to follow attacks of melancholia. Galvanization of the cerebrum should be very carefully done, one large electrode (about four to five inches) being placed upon the forehead, another of equal size upon the occiput, and a gentle current of three to five milliampères passed for a period varying from two to five minutes. Great care should be taken to avoid any interruption in the current. Galvanization of the spinal cord should be done by means of electrodes, of the size just mentioned, upon the upper cervical and lower dorsal cord respectively, but a much larger current should be employed, ranging from five to fifteen to twenty milliampères, and the sitting lasting from five to fifteen minutes. General faradization is also often of great use. In some cases the electric breeze from a static or Holtz machine is extremely beneficial to the patient.

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PULSATING PLEURISY.[2]

By William Osler, M.D.,
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Pulsating pleurisy is such a rare condition that the following case is worth placing upon record:

Strain in lifting: pain in left side; rapid effusion, at first serous, necessitating two aspirations; pyo-pneumothorax; pulsation of side; free drainage; recovery.—James F., aged twenty-three years, laborer, was admitted to the University Hospital March 3, 1888. Family history good; none of his relatives have had phthisis; with the exception of an attack of rhumatism in 1885, he has enjoyed uniformly good health.

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[1] Phosphorus one grain, absolute alcohol five drachms, glycerine one and one-half ounces, spirit of wine two drachms, spirit of peppermint two scruples; dissolve the phosphorus in the alcohol with a little heat, at the same time warm the spirit and the glycerine together. Mix the two solutions while hot, and add the spirit of peppermint on cooling. Dose one-half a drachm to two drachms.

[2] Read by title at the meeting of the Association of American Physicians, Washington, 1888.

On February the 23d, eight days before admission, he sprained his back by lifting a piece of timber twenty feet in length and ten inches in diameter. Three men were lifting it, but one of them let go his hold so that the patient had to exert his utmost strength to support his end of the piece. At the time he did not feel any discomfort, but that evening he became sore and stiff. He slept well, and the next day, a public holiday, he went about with his comrades, but complained on several occasions that he had sprained his back with heavy lifting. During the evening the pain grew worse and he passed a restless night. The following morning he did not feel well enough to get up and the pain had become almost unbearable. There was no cough or shortness of breath; he does not know whether he had any fever.

From the 26th to the 3d, the date of his admission, he was "up and down;" in bed part of the time, and part of the time by the kitchen fire. The pain in the back was his only complaint. He is positive he had no cough, but he was short of breath.

On admission, the patient looked very ill; face flushed, tongue dry and coated; respirations 36, temperature 100⅘°. He was able to lie down in bed. The importance attached to the lifting on February 23d may be gathered from the fact that he was admitted to the surgical ward as a case of injury to the back, and subsequently transferred. The day after admission he had much pain, of a cutting nature, in the left side, in the axillary region outside the nipple. There was also extreme tenderness on palpation.

I saw the patient for the first time on March 5th, and was struck with his distressed appearance. He lay propped up in bed, had slight dyspnœa, dry tongue, pulse 100, temperature 100°. He complained of severe pain in the left back, just below the scapula. On examination the existence of a large effusion in the left pleura was readily determined. The cardiac impulse was in the third right interspace in the para-sternal line. I noticed one or two special features in the case: the sudden onset after the strain, the remarkable rapidity with which the effusion had taken place, and the unusual amount of pain on palpation.

March 6th, a more thorough examination was made: expansion was almost negative on the left side; the intercostal spaces indistinguishable. The only cardiac impulse visible was in the third right interspace. Tactile fremitus was diminished. There was uniform dulness on the left side reaching to the clavicle and extending a little beyond the right margin of the sternum in the second interspace. By a hypodermic puncture the fluid was shown to be serous. On the principle that a full pleura demands immediate aspiration this operation was performed by Dr. Daland before the ward class, and fifty ounces of clear serum removed.

On the 5th and 6th, the patient seemed much relieved. By the 9th the fluid had reaccumulated and the heart beat was again visible to the right of the sternum, the dulness reaching to the level of the clavicle. Aspiration was again performed and two quarts of slightly turbid serum removed. He seemed to improve very much after this. The temperature kept below 99°, the dyspnœa was relieved, the appetite improved, and with the exception of pain in the left side he felt very comfortable. The signs of effusion persisted and the heart beat could be seen in the third left and the third right interspaces.

16th. The following note was made: Condition of patient has improved, pulse 84, respiration 28, temperature 98°; dyspnœa seems quite relieved, sleeps with his head low, complains only of chest pain; left side scarcely moves, and looks somewhat bulged. Cardiac impulse seen in the second and third spaces on both sides close to the sternum. The left interspaces not specially prominent. Tactile fremitus felt at the extreme apex, but nowhere else on the left side; percussion note clear to the second rib, dull below this. On the right side normal.

Auscultation: Inspiration is loud and breezy in the subclavicular and supra-scapular regions. Below these points the respiratory murmur has a distinctly amphoric character, contrasting remarkably with the breath sounds over the upper part of the lung. The voice sounds in the lower regions are very articulate; no metallic tinkling on coughing. No bell sound, nor could succussion be obtained.

19th. To-day for the first time it was observed that the percussion note in the left subclavicular region was distinctly tympanitic. Dulness extended from the upper border of the third rib, and was distinctly movable. This was very marked when he lay on his right side, in which position the percussion note in the axilla became hyper-resonant without tympanitic quality. Posteriorly in erect position at outer angle of the scapula the percussion note was distinctly tympanitic. To-day, for the first time, the bell sound was obtained with the coins.

26th. Since the 20th he has had irregular fever reaching 102° in the evening. He has, however, felt much better. The physical signs persist; in the recumbent posture the note is hyper-resonant to the lower border of the third rib. Just below the nipple it is distinctly tympanitic, from this point into the axilla there is dulness. When he turns on his right side the entire left axilla is resonant. There is amphoric breathing from the third rib, best marked in the lower axilla, where the percussion note is dull. There was noticed to-day in the fourth, fifth, and sixth interspaces in the mid-axillary line a remarkable pulsation. The whole side received a very positive shock, systolic in time and synchronous with the cardiac impulse in the third right interspace just above the nipple; the hand placed on the left side is distinctly lifted with each impulse. When he lies toward the right side the pulsation in the left axilla is a little more marked than when he is flat on his back.

27th. The common decubitus is on the left side and in this position the heart impulse is well seen just above the right nipple. The pulsation in the left mammary and axillary regions is very marked. The maximum intensity is outside the left nipple. When he turns on the right side the pulsation is most marked in the fifth and sixth interspaces in the mid-axillary line. Palpation gives a very decided heave and a distinct shock is felt. In the erect posture, the pulsation is not so forcible, though still very evident. The coin sounds are now unusually distinct. Succussion is not obtainable.

29th. The left chest looks larger and fuller than the right; it is completely immobile. The intercostal spaces are obliterated with the exception of the sixth, which is still visible. The systolic impulse on the left side is very marked, and can readily be seen by the students in the distant seats of the amphitheatre. Measurement on the right side gives sixteen and one-eighth inches, expansion one-half inch; on the left side, seventeen and one-quarter inches, practically no expansion.

Palpation.—Tactile fremitus is absent on the left side. Heaving impulse in the mammary and axillary regions well felt with the hand.

Percussion.—Clear, hyper-resonant note to upper border of the third rib. From the third to the fifth it is distinctly tympanitic. Below this, in the axillary region there is dulness. When he turns on his right side the pulsation in the mammary and axillary regions is more marked. Where the percussion note was dull, it is now tympanitic.

Auscultation.—In the left infra-clavicular region the breath sounds are loud and distinct, not amphoric. In the third and fourth interspaces the respiratory murmur is scarcely audible. In the axillary regions there is distant but distinct amphoric breathing, very clearly heard when a deep breath is taken. No special amphoric echo about the voice, the vibrations of which are not communicated to the ear; posteriorly there is distant amphoric breathing.

31st. The irregular fever has persisted and the presence of pus was demonstrated with a hypodermic needle. It was decided to open the pleura, which was done by Dr. Ashhurst; fully three pints of pus escaped. A large drainage tube was inserted in the eighth interspace below the angle of the scapula. After the operation, the heart did not return to its normal position, though it beat to the left of the sternum. Patient stood the operation very well, the evening temperature was only 98.2°.

April 3. Pulse 92, respiration 24, temperature 98°. Inspection showed a remarkable change on the left side of the chest; it already looks smaller than the right, and there is flattening in the second, third, fourth, and fifth intercostal spaces; there is very marked pulmonary resonance to fourth rib. Tympanitic in the fifth, sixth, and seventh interspaces.

With the exception of the fifth, when the temperature rose in the evening to 102°, the patient's condition was most satisfactory. He slept well, appetite good, temperature did not rise above 99°; there was free drainage through tube.

14th. Chest measured to-day: right side, fifteen and a half inches; left, fifteen and one-eighth. Discharge very light. From this time the patient improved very rapidly; temperature has not risen above 100°.

May 9. The discharge is now slight. A smaller drainage tube was introduced; the discharge gradually diminished, and he improved rapidly in strength and weight. Early in June the tube was removed.

June 10. The note is that the sinus has entirely healed. He left the hospital on the 15th, weighing 140 pounds, a gain of twenty-two pounds since April 14th.

The condition of his chest on discharge was as follows: There was marked flattening of the left side, particularly in the axillary and mammary regions. The circumference was: right, fifteen and three-quarters; left, fifteen and one-quarter inches. The percussion note was clear to the fifth rib and the spine of the scapula behind, below these points there was dulness. Loud breath sounds in the clavicular and mammary regions, feeble and distant in lower axillary, and at base.

I believe that this was an instance of pneumothorax from the outset, one of those interesting cases to which Dr. Samuel West[1] and Dr. de Havilland Hall[2] have called attention, in which the condition has followed strain in a person previously healthy. It is very improbable that on the eighth day of an acute pleurisy there would be a serous exudation of such extent as to reach the clavicle and encroach on the pleura of the other side. On the other hand, the percussion note, as is well known, may be dull in pneumothorax when the tension of the thoracic wall is very great, and I think that in this way the mistake arose. The mode of onset in a healthy man, the course of the disease, and the rapid and complete recovery favor the view that the strain had induced a pneumothorax which excited the pleurisy.

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[1] Clin. Soc. Transactions, vol. xvii.

[2] Ibid., vol. xx.

The chief interest of the case lies, however, in the curious phenomenon which developed in the fifth week after the attack.

Instances of tumors of the thoracic wall, which pulsated synchronously with the heart, are mentioned by several of the older writers—Baillon (1640), Le Roy (1776), and Pelletan (1810)—but the first cases of pulsating empyema, recognized as such, were reported by the late Dr. R. L. Macdonnell,[1] Professor of Clinical Medicine in McGill University, Montreal, who, at the time, was clinical assistant to Drs. Graves and Stokes, at the Meath Hospital, Dublin.

In the first of these cases a large tumor appeared in the cardiac region, which, after pulsating for some time, became red, tense, and shining, and then burst, giving exit to a large quantity of pus.

In the second case two tumors appeared in the lower part of the left side, presenting fluctuation and pulsation. When opened purulent matter escaped in large quantities.

In the third case two large tumors appeared in the lower portion of the left side of the chest, presenting fluctuation and pulsation. They were opened and discharged a large quantity of pus. Death followed in all these cases.

Dr. Macdonnell remarked that this condition was new in the history of empyema.

Several careful studies of pulsating pleurisy have recently been made. One by Comby,[2] who collected 27 cases; and a second by Kepler,[3] who has collected 38 cases, only 2 of which are reported by American authors—Drs. Flint[4] and Dillingham,[5] from the wards of Dr. J. H. Ripley at St. Francis Hospital, New York.

I am able to add the reports of a few additional cases from this side of the Atlantic, but from inquiries which I have made from the hospital physicians of this country the condition appears to be extremely rare. Dr. George Ross, Professor of Clinical Medicine in McGill University,

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[1] Dublin Journ. Med. Science, March, 1844.

[2] Archives Générales, 1883.

[3] Deutsches Archiv für klin. Medicin, Bd. xl. 1887.

[4] Clinical Report on Chronic Pleuritis, p. 47; and On the Respiratory Organs, p. 581, 1856.

[5] New York Medical Record, 1884.

Montreal, has given an account of an extremely interesting case,[1] which closely simulated aneurism:

A man, aged thirty-seven years, was admitted to the General Hospital suffering from pain in the side, cough, and fever, which lasted about five days, and which followed a severe wetting. There was deficient expansion on the left side with dulness to the angle of the scapula and diminished fremitus. Within ten days the expansive movement of the left side became more impaired. The second and third intercostal spaces in front became prominent, presenting perceptible pulsation synchronous with systole of the heart. About five days after the onset of the illness he had a severe fit of coughing, in which he brought up, at least, a pint of pure pus, thick, creamy, and odorless. The cough continued for a few days, with expectoration of pus. The percussion note on the left side became clearer and the pulsating tumor entirely disappeared. The temperature fell to normal and the man's strength returned. Ten weeks from the onset the man left the hospital strong and well.

Dr. F. P. Henry, of Philadelphia,[2] reports a case from the Episcopal Hospital:

Woman, aged thirty years, admitted in the spring of 1880. On the left side of the thorax there were three strongly pulsating tumors—one about the size of half a large orange, in the left mammary region, directly over the central portion of the heart; a second, much smaller and acuminated—*i. e.*, with apex much smaller than the base—was situated on the left antero-inferior portion of the thorax; and a third, the largest of the three, on the left postero-inferior portion, its long diameter, about four inches, corresponding with that of the vertebral column. All these tumors possessed a strong expansile, systolic pulsation. The day after admission pus was withdrawn hypodermically from the smaller tumor. The tumor over the heart contained air, which was very evident on manipulation. Aspiration was performed, and, some time after, a drainage tube was inserted by Dr. Ashhurst. The woman was removed by her friends, but was alive a year after the operation.

Dr. Janeway, of New York, writes that he has met with one case of empyema of the left side, in which the tumor was situated in the left second interspace, which pulsated when the patient stood erect, but when the patient was lying down air filled the sac.

These cases, with the thirty-eight collected from literature by Comby and Kepler, make a total of forty-two cases. The condition is almost invariably met with on the left side. In only three instances, those of Kepler, Heyfelder,[3] and Geigel,[3] was the empyema in the right side. Kepler thinks there may have been a doubt in Heyfelder's case, but the report seems perfectly clear. The tumor appeared between the second and third ribs on the right side, and pulsated distinctly. It may possibly have been a mediastinal abscess, as it was close to the pleural margin. Only eight ounces of pus flowed out when punctured.

In the case of Geigel, a man, æt. fifty-seven, had in the right mammary region a prominent projection which pulsated synchronously with the heart. The case terminated fatally. Between six and seven pounds of pus were found in the pleura.

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[1] Canada Med. and Surg. Journ., May, 1885.

[2] Proceedings of the Phila. Co. Med. Society, vol. iii. p. 85.

[3] Abstract by Kepler, l. c.

Empyema existed in all the cases, with the exception of one reported by Kepler, from Eichhorst's clinic, in which the fluid was serous. It occurred in a boy æt. fourteen, who, fourteen days before his admission, had been seized with a severe pain on the right side, and shortly afterward great tenderness at the seventh rib. There was dulness at the right base, which rapidly increased until it reached the angle of the scapula, and within a few days there were signs of effusion in the right thorax. On first examination the right side was enlarged, intercostal spaces prominent. There was active pulsation over the antero-lateral region of the right side of the chest reaching as high as the third rib, and synchronous with the movements of the heart. The apex-beat of the heart was 1.5 cm. above the nipple in the left mammary line. On account of suffocative symptoms aspiration was performed and 800 c. cm. of pure serous fluid removed. At a second puncture 200 c. cm. more were removed. Pulsation ceased after the withdrawal of the fluid. In fourteen days the fluid reaccumulated. An exploratory puncture showed it to be pus, and the operation for empyema was made. The seventh rib was resected and 300 c. cm. of pus removed.

In only two instances of Kepler's series was pyopneumothorax present. One reported by Féréol,[1] a man æt. twenty-two, had, in July, 1882, left-sided serous effusion, which was tapped, and he recovered. On October 27th there was again a large left side effusion with air. The beat was at the right nipple, and about the end of November pulsation of the whole left side was noticed, synchronous with the heart. It was most marked behind and in the axilla. The aspiration of 2½ litres of pus abolished the pulsation. In Dillingham's case the man had pneumothorax.

To these cases must be added the one which I here report, and the cases of Henry and Janeway, in both of which there was evidently air in the pleura.

Two groups of cases may be recognized: 1, the intra-pleural pulsating pleurisy; 2, the pulsating empyema necessitatis, in which there is an external pulsating tumor. The latter condition, the most common, occurred in twenty-five of the forty-two cases, probably also in a larger proportion, as there are several reports with very scanty details. The external tumor is usually single, but in five cases there were two tumors, and in one, Dr. Henry's case, three. The perforation of the pleura usually occurs in the anterior aspect of the chest, from the second to the sixth rib, sometimes close to the sternum. In three cases the tumor appeared posteriorly—at the spine, at the angle of the scapula, and in the lumbar region. In the intra-pleural cases the pulsation is usually in the antero-lateral region of the affected side, and may be evident on palpation only, or, as in the case here reported, it may be visible even at a distance.

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[1] Quoted by Kepler.

Pulsating pleurisy usually occurs in cases in which the fluid has existed for some time, but that it may occur in acute cases, even with a serous exudation, is illustrated by Kepler's patient. In Ross's case and in mine the condition was also acute.

Various explanations of the phenomenon have been offered. Dr. Broadbent[1] suggests that it occurs when adhesions exist between the layers of the pericardium and between the pericardium and the chest wall. But that this cannot hold good in all cases is shown by reports of post-mortems in which such adhesions were not present. Traube regarded destruction of the costal pleura, and marked paresis of the intercostal muscles as the conditions which rendered pleurisy possible. In the case which I have reported, there was persistent tenderness of the thoracic walls, suggestive, to say the least, of involvement in an unusual degree of the parietal structures, but there was no œdema or special protuberance of the spaces, and the condition came on too early to have been due to destructive changes in the pleura. It was probably due to extreme distention of the side. Bouveret, in his recent monograph on empyema,[2] holds that the pulsation is met with whenever the resistance of the thoracic wall is greatly reduced, as in the way Traube suggests, or when the resistance on the part of the diaphragm is heightened, as by the deposition of a thick layer of fibrin. The fact that the abstraction of a very small quantity of fluid will at once abolish the pulsation, indicates that a certain degree of pressure is a necessary condition. Comby thinks that the pulsation only occurs when the lung is compressed and adherent to the pericardium, so that the heart movements are communicated through it to the pleural fluid, and so to the chest wall. Féréol makes a somewhat similar suggestion, holding that in every instance the condition is one of pneumothorax, in which air forms an elastic cushion between the pericardium and the fluid through which the pulsations of the heart are directly transmitted to the chest wall.

The cases have been mistaken for aneurism, and the situation in which the pulsating empyema necessitatis usually develops renders the error very pardonable. The doubt can readily be solved with a fine hypodermic needle.

The prognosis in pulsating pleurisy is not very favorable. Of the thirty-eight cases in Kepler's series, seventeen died. But we must remember that most of these cases occurred before the days of safe and frequent operations upon the chest wall.

Complete evacuation of the fluid with free and permanent drainage meets the indications for treatment.

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[1] Lancet, 1884.

[2] Traité de l'empyeme, par L. Bouveret, Paris, 1888.